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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,679	09/25/2003	Paul H. Holloway	5853-437	8382
30448	7590	11/19/2004		
AKERMAN SENTERFITT P.O. BOX 3188 WEST PALM BEACH, FL 33402-3188			EXAMINER HARRINGTON, ALICIA M	
			ART UNIT 2873	PAPER NUMBER

DATE MAILED: 11/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/670,679

Applicant(s)

HOLLOWAY ET AL.

Examiner

Alicia M Harrington

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 25 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-8, 10, 11 and 14-20 is/are rejected.
- 7) ☒ Claim(s) 4, 9, 12 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The Examiner has considered the information disclosure statement filed on 9/25/03. The information disclosure statement filed on 2/9/04 was partially considered because the IDS cited references that were also cited on the IDS filed on 9/25/03.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 17-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 recites a method of forming a compound lens. The initial step of mounting a plurality of lenses on a multidimensional support structure supports the claims scope of forming a compound lens. However, steps of capturing an optical signal and generating an image are drawn to creating a compound or panoramic or multi-field of view image rather than forming a lens.

Claims 18 and 19 fail to include any further steps for creating a compound lens (fails to further limit). Thus, claims 17-19 fails to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20 inherits its indefiniteness from claims 17 from which it depends.

*Oath/Declaration*

4. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:  
35 USC 119 (e) requires that claims to priority for provisional applications be identified by specific reference to the application. The applicant failed to provide a correct provisional application number (for example: 60/...).

*Claim Rejections - 35 USC § 102*

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1,2,5-7 are rejected under 35 U.S.C. 102(b) as being anticipated by McCutchen (US 5,023,725).

Regarding claim 1, McCutchen discloses an imaging device, comprising (see figure 19):  
a plurality of lenses (lens mount 78; see figure 5 and figure 19; col. 12, lines 15-67 and col. 20, lines 32-69) mounted on a multi-dimensional support structure, wherein each lens in the plurality of lenses has a field of view;  
a plurality of optical detectors (for example CCD –86) corresponding to the plurality of lenses for capturing an optical signal from at least two lenses among the plurality of lenses (there are several CCD's and lenses receiving an image);  
means for combining (processor) the optical signal from at least two lenses (combines from each camera module; see col. 11, lines 57-69; col. 12, lines 1-15; col. 20, lines 43-69); and means for generating an image (for example: spherical image in HDTV; see for example figure 18) with at

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least a variable field of view (camera all have different field of view to used create a spherical image).

Regarding claim 2, McCutchen discloses the means for combining and the means for generating comprises a processor (see for example col. 14, lines 45-46 and col. 15, lines 3-50; col 16, lines 50-55).

Regarding claim 5, McCutchen discloses the imaging device of claim 1, wherein the multi-dimensional support is formed substantially in the shape of at least one among a flat surface, a hemisphere, an elliptical shape, and a sphere (see figure 19).

Regarding claim 6, McCutchen discloses the imaging device of claim 1, wherein each of the plurality of optical detectors comprises at least one among a charge coupled device and a complementary metal- oxide-semiconductor device (see col. 12, lines 50-55).

Regarding claim 7, McCutchen discloses the imaging device of claim 1, wherein the field of view for each lens in the plurality of lenses overlaps each other (see col. 20, lines 60-69).

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCutchen (US 5,023,725)

Regarding claim 10, McCutchen and McCall fail to specifically disclose the plurality of lenses uses diffractive optics. However, the Examiner takes official notice that wide angular imaging systems use diffractive optics to reduce chromatic aberration. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McCutchen and McCall to implement diffractive optics in their optical systems, since chromatic aberration exist in lens systems, it existence deteriorates image quality, and such implementation would not

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increase the expense of overall system because the diffractive lens is easily incorporated in optical systems.

9. Claims 3, 8, 11, 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCutchen (US 5,023,725) in view of McCall et al (US 6,002,430).

Regarding claim 3, McCutchen fails to specifically disclose wherein the means for combining further comprises a substrate having circuitry thereon for image integration and processing of a plurality of output signals from the plurality of optical detectors.

In the same field of endeavor, McCall discloses the detectors/camera outputs signals to a hemispherical to spherical converter (216) which is a substrate having circuitry thereon to image integration and processing of a plurality of optical detectors (see col. 8, lines 55-67 and col. 9, lines 19-39). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McCutchen, as taught by McCall, since it provides an equivalent processing function and McCall teaches a processing substrate is known in the art.

Regarding claim 8, McCutchen discloses a processor that produces a spherical image with increased resolution at a selected TV signal rate (HDTV, NTSC, PAL-see col. 13, lines 10-25). However, McCutchen fails to specifically disclose the processor is programmed to generate the image with a variable field of view and a variable resolution.

In the same field of endeavor, McCall discloses creating spherical images using a processor to produce spherical images at a real time video rate, variable field of view, various magnifications by a controlled input. Thus, Mc Call teaches a variable field of view and a variable resolution (spatial; see col. 13, lines 20-55 and col. 16, lines 60-65 and col. 17, lines 5-12). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McCutchen, as taught by McCall, since a processor with this functionality are known to wide angle/spherical imaging and such an implementation allows greater freedom in image manipulation by the user for spherical image formatting.

Regarding claim 11, McCutchen discloses an imaging device, comprising (see figure 19):

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a plurality of lenses (lens mount 75; see figure 5 and figure 19; col. 12, lines 15-67 and col. 20, lines 32-69) mounted on a multi-dimensional support structure, wherein each lens in the plurality of lenses has a field of view;

a plurality of optical detectors (for example CCD –86) corresponding to the plurality of lenses for capturing an optical signal from at least two lenses among the plurality of lenses (there are several CCD's and lenses receiving an image);

processor for combining the optical signal from at least two lenses (combines from each camera module; see col. 11, lines 57-69; col. 12, lines 1-15; col. 20, lines 43-69) to control the field of view (images of the spherical field of view). However, McCutchen fails to specifically disclose electronically controlling the field of view and a resolution of the image.

In the same field of endeavor, Mc Call disclose creating spherical images using a processor to produce spherical images at a real time video rate, variable field of view, various magnifications by a controlled input. Therefore, McCall teaches a variable field of view and a variable resolution (temporal, optical or spatial; see col. 13, lines 20-55 and col. 16, lines 60-65 and col. 17, lines 5-12). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McCutchen, as taught by McCall, since a processor with this functionality are known to wide angle/spherical imaging and such an implementation allows greater freedom in image manipulation by the user in spherical image formatting.

Regarding claim 14, McCutchen discloses the imaging device of claim 11, wherein the multi-dimensional support is formed substantially in the shape of at least one among a flat surface, a hemisphere, an elliptical shape, and a sphere (see figure 19).

Regarding claim 15, McCutchen discloses the imaging device of claim 11, wherein each of the plurality of optical detectors comprises at least one among a charge coupled device and a complementary metal- oxide-semiconductor device (see col. 12, lines 50-55).

Regarding claim 16, McCutchen discloses the imaging device of claim 1, wherein the field of view for each lens in the plurality of lenses overlaps each other (see col. 20, lines 60-69).

Regarding claims 17-19, McCutchen discloses a method of forming a compound lens in an imaging device, comprising (see figure 19):

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mounting a plurality of lenses (lens mount 78; see figure 5 and figure 19; col. 12, lines 15-67 and col. 20, lines 32-69) mounted on a multi-dimensional support structure, wherein each lens in the plurality of lenses has a field of view;

capturing an optical signal from at least two lenses among the plurality of lenses using a plurality of optical detectors (for example CCD –86) corresponding to the plurality of lenses (there are several CCD's and lenses receiving an image);

processor for combining the optical signal from at least two lenses (combines from each camera module; see col. 11, lines 57-69; col. 12, lines 1-15; col. 20, lines 43-69) to create an image with a variable field of view. However, McCutchen fails to specifically disclose using a plurality of optical detectors corresponding to the plurality of lenses for combining the optical signals from at least two lenses to form a single image and generating an image with at least one among a variable field of view and variable resolution.

In the same field of endeavor, Mc Call discloses an imaging system where a single optical detector receives images from at least two lenses (see col. 4, lines 40-45) that can be used to create a spherical image. Mc Call also discloses using a processor (electronically) to produce spherical images at a real time video rate, variable field of view, various magnifications by a controlled input. Therefore, McCall teaches a variable field of view and a variable resolution (spatial; see col. 13, lines 20-55 and col. 16, lines 60-65 and col. 17, lines 5-12). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McCutchen, as taught by McCall, since a optical detector receiving optical signals from at least two lenses and a processor with this functionality are known to wide angle/spherical imaging. In addition, the implementation allows greater freedom in image manipulation by the user in spherical image formatting with reduced imaging elements (less heat).

Regarding claim 20, McCutchen and McCall fail to specifically disclose the plurality of lenses uses diffractive optics. However, the Examiner takes official notice that wide angular imaging systems use diffractive optics to reduce chromatic aberration. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify McCutchen and McCall to implement diffractive optics in their optical systems, since chromatic aberration exist



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in lens systems, its existence deteriorates image quality, and such implementation would not increase the expense of overall system because the diffractive lens is easily incorporated in optical systems.

***Allowable Subject Matter***

10. Claims 4,9,12,13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: Regarding claims 4 and 13, prior art taken either singularly or in combination fails to anticipate or fairly suggest the limitations of the dependent claims, in such manner that a rejection under 35 U.S.C 102 or 103 would be proper. The prior art fails to teach a combination of all the claimed features as presented in independent claims, which at least include the plurality of lenses comprises a plurality of photon sieve lenses as claimed.

Regarding claim 9, prior art taken either singularly or in combination fails to anticipate or fairly suggest the limitations of the dependent claims, in such manner that a rejection under 35 U.S.C 102 or 103 would be proper. The prior art fails to teach a combination of all the claimed features as presented in independent claims, which at least include an array of sub-wavelength apertures and relief structure about each aperture as claimed.

Regarding claim 12, prior art taken either singularly or in combination fails to anticipate or fairly suggest the limitations of the dependent claims, in such manner that a rejection under 35 U.S.C 102 or 103 would be proper. The prior art fails to teach a combination of all the claimed features as presented in independent claims, which at least include the plurality of lenses each comprises an array of sub-wavelength apertures as claimed.

***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alicia M Harrington whose telephone number is 571 272 2330. The examiner can normally be reached on Monday - Thursday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571 272 2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

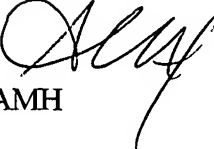
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Alicia M Harrington

Examiner

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AMH